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400 COMMONWEALTH DRIVE WARRENDALE, PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 5693

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Revised

UNS S30200

STEEL WIRE, CORROSION RESISTANT
18Cr - 9.0Ni (SAE 30302)
Cryogenically Produced, High Tensile Strength

1. SCOPE:

1.1 Form: This specification covers a corrosion resistant steel in the form of round, square, and rectangular wire.

1.2 Application: Primarily for springs requiring corrosion and heat resistance up to 500°F (260°C).

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2241 - Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Bars and Wire
AMS 2248 - Chemical Check Analysis Limits, Wrought Corrosion and Heat Resistant Steels and Alloys, Maraging and Other Highly-Alloyed Steels, and Iron Alloys
AMS 2350 - Standards and Test Methods
AMS 2371 - Quality Assurance Sampling of Corrosion and Heat Resistant Steels and Alloys, Wrought Products Except Forgings and Forging Stock

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials
ASTM E353 - Chemical Analysis of Stainless, Heat-Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E353, by spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other analytical methods approved by purchaser:

	min	max
Carbon	-	0.15
Manganese	-	2.00
Silicon	-	1.00
Phosphorus	-	0.040
Sulfur	-	0.030
Chromium	17.00	19.00
Nickel	8.00	10.00
Molybdenum	-	0.75
Copper	-	0.75

3.1.1 Check Analysis: Composition variations shall meet the requirements of AMS 2248.

3.2 Condition: Spring temper, cryogenically cold drawn to required size.

3.2.1 Wire shall be supplied in coils, unless otherwise specified.

3.3 Properties: Wire shall conform to the following requirements:

3.3.1 As Cryogenically Cold Drawn:

3.3.1.1 Tensile Properties: Shall be as follows for rectangular wire having nominal width not more than 4 times the nominal thickness and for round wire and square wire 0.050 - 0.148 in. (1.25 - 3.75 mm) in nominal diameter or thickness, determined in accordance with ASTM E8:

Form	Tensile Strength
Rounds	275,000 - 310,000 psi (1895 - 2135 MPa)
Square and Rectangular	245,000 - 280,000 psi (1690 - 1930 MPa)

3.3.1.1.1 When straightened or flattened cut lengths are ordered, tensile strength requirements shall be as agreed upon by purchaser and vendor.

3.3.1.2 Wrapping: Round wire shall withstand, without cracking, wrapping at room temperature five full, closely-spaced turns around a diameter equal to the nominal diameter of the wire.

3.3.1.3 Coiling: Round wire 0.050 - 0.148 in. (1.25 - 3.75 mm) in nominal diameter shall show a uniform pitch with no splits or fractures when wound into a tightly closed coil on an arbor of the size specified in Table I and the resultant coil stretched to a permanent set of 4 times its as-wound length.

TABLE I

Nominal Wire Diameter Inch	Arbor Diameter Inch
Over 0.050 to 0.055, incl	0.21
Over 0.055 to 0.125, incl	0.25
Over 0.125 to 0.148, incl	0.38

TABLE I (SI)

Nominal Wire Diameter Millimetres	Arbor Diameter Millimetres
Over 1.25 to 1.40, incl	5.25
Over 1.40 to 3.20, incl	6.25
Over 3.20 to 3.75, incl	9.50

3.3.2 As Stress Relieved: Wire shall have the following properties after being stress relieved by heating to 800° - 850°F (425° - 455°C), holding at heat for 30 min. ± 5, and cooling in air:

3.3.2.1 Tensile Properties: Shall be as follows for rectangular wire having nominal width not more than 4 times the nominal thickness, and for round wire and square wire 0.050 - 0.148 in. (1.25 - 3.75 mm) in nominal diameter or thickness, determined in accordance with ASTM E8:

Form	Tensile Strength
Rounds	290,000 - 340,000 psi (2000 - 2345 MPa)
Square and Rectangular	260,000 - 310,000 psi (1795 - 2135 MPa)

3.3.3 Wire under 0.050 in. (1.25 mm) or over 0.148 in. (3.75 mm) in nominal diameter or thickness shall have properties as agreed upon by purchaser and vendor.

3.4 Quality: Wire, as received by purchaser, shall be uniform in quality and condition, sound, and free from kinks, twists, scrapes, splits, cold shuts, and other imperfections detrimental to usage of the wire.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2241.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of wire shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the wire conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with AMS 2371.

4.4 Reports:

4.4.1 The vendor of wire shall furnish with each shipment three copies of a report showing the results of tests for chemical composition of each heat and for tensile properties of each lot. This report shall include the purchase order number, heat number, AMS 5693, size, and quantity from each heat.